IOT Based Wireless EV Charging Station

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Abstract*: The adoption of Electric Vehicles (EVs) is growing rapidly, driven by environmental concerns and the transition to sustainable energy. Traditional EV charging infrastructure, reliant on wired connections, faces challenges such as wear, inconvenience, and inefficiency. This paper introduces the "Wireless Solar EV Charging Station," an innovative solution that integrates wireless charging technology, solar energy, and IoT-driven automation. Leveraging inductive coupling, the system enables wireless energy transmission for seamless charging at designated parking spots, eliminating the need for physical cables. Solar panels make the station self-sustaining, with the ability to supply excess energy back to the grid, promoting renewable energy integration. An IoT-based framework automates operations, including real-time user balance checks, fee deductions, and account updates, enhancing user interaction. A novel feature of smart parking slot management without physical sensors allows users to reserve slots via a mobile application, ensuring guaranteed charging upon arrival. The system, powered by a Node MCU microcontroller, verifies credentials, initiates charging, monitors battery status, and updates availability on an LCD display and the app in real time. This integrated approach offers an efficient, user-friendly, and sustainable solution for modern EV charging needs, contributing significantly to green energy adoption.*

Keywords: Wireless charging, Solar energy, IoT, Inductive coupling, EV charging station, Smart parking, Renewable energy, Node MCU, Energy conservation, Sustainable infrastructure

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